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Comment on acp-2021-798

Anonymous Referee #1

Referee comment on "Temporal and vertical distributions of the occurrence of cirrus clouds over a coastal station in the Indian monsoon region" by Saleem Ali et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-798-RC1, 2021

Manuscript Titled "Temporal and vertical distributions of the occurrence of the cirrus clouds over the coastal station in the Indian monsoon region" by Ali et al.,

General Comment

This paper discusses on the vertical distribution of tropical cirrus based on Micro-Pulsed Lidar observations carried out at a tropical station, Kattankulathur (12.82° N, 80.04°E), near Chennai, during 2016, 2017 and 2018. The highlight of the study is on the diurnal variation of the tropical cirrus, which is rarely reported elsewhere. Though the general characteristics of the tropical cirrus over the study/near-by region (e.g., lidar observations from Gadanki) are well known, the study on the diurnal variation of tropical cirrus is being reported for the first time. The authors have showed the diurnal variation of cirrus for different seasons, based on extensive MPL observations carried out in each month during 2016, 2017 and 2018 and delineated the occurrence of single-layer and multi-layer cirrus and their inter-annual variations. The authors also tried to correlate the cirrus occurrence with the convection and tropopause temperature.

Major comments:

- Occurrence of cirrus is frequent in the altitude region 12-16 km. The POC shown in Figure 6 shows cirrus occurrence very close to CPT and even above CPT-altitude. During July and August, cirrus (cirrus-top) is observed at CPT and also above the CPT-altitude. Mean altitude separation of cirrus-top from CPT-altitude also shows significant seasonal variation. Cirrus/ice particles at the vicinity of CPT and above have large implications. The authors may quantify the occurrence of cirrus above CPT (and the altitude separation from CPT-altitude) for different seasons (from hourly/high resolution data on different days in a month/season) and highlight the implications of cirrus

near/above the CPT in the revised version.

- Authors can check, if the same cirrus persists more than a day from the consecutive days of MPL observations. Persistence of cirrus for longer time has large implications in the upper troposphere/near tropopause region.
- The manuscript requires some more tightening, by editing unnecessary discussion/presentation, removing the repetitions in the text and highlighting the essence of the results. Results should be presented in clear and effective way, without losing the crisp. Figure 8 can be avoided, as the details shown in this figure are already seen in figure 7.
- Authors should carefully modify the text in the manuscript correcting the grammar errors.

Specific/Minor comments

Minor comments are commented as notes at the required places of the text in PDF version of the manuscript.

Please also note the supplement to this comment:
https://acp.copernicus.org/preprints/acp-2021-798/acp-2021-798-RC1-supplement.pdf